



An Ethnomedicine Approach to Aromatic Plant Use in *Batimung* Tradition of North Banjarmasin Subdistrict Banjarmasin, Indonesia

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ABSTRACT

Ethnomedicine is the study of the health-related indigenous knowledge of a particular ethnic group. Unique to the Banjar people is their use of fragrant plants blended by herbalists to treat illness, and the process is known as *Batimung*. Therefore, this study aimed to identify plants and the parts of aromatic plants used for practicing *Batimung*. It is a descriptive study with prospective observational data collection using purposive and quota sampling techniques. The number of therapist and user respondents were 5 and 98 people, respectively. The results showed that 27 types of plants were used, where 25 contained terpenoids. The plant parts used are leaves, flowers, bark, rhizomes, roots, fruit, stems and cobs. The approach entails boiling the plant materials and utilizing the resulting steam in the processing. In conclusion, the most widely used aromatic plant parts are the leaves and flowers of *Citrus hystrix* DC.

Keywords: Ethnomedicine, *Batimung*, Therapists, Banjarmasin, Aromatic plants, Sauna

Introduction

Indonesia is one of the mega bio-diversity countries with more than 25,000-30,000 plant species,¹ with 160-200, producing essential oils.² In 2010, according to the Central Statistics Agency, the country had 1,300 ethnic groups, including Banjar, with diverse cultures such as *Batimung* that fulfilled all aspects of people's lives. The tradition originated from South Kalimantan and was performed by a Banjar descendant before marriage to eliminate body odor and excessive sweating. Additionally, it is used for *wisa* treatment³ since the Banjar community believes that the disease is caused by supernatural beings capable of turning the patient's body color yellow.⁴ *Batimung* is traditionally performed by mixing plants with distinctive aromas. Ideham *et al.*³ explained that this tradition had been passed down from several generations. Exploration of the types and uses of aromatic plants in this tradition is still minimal. Meanwhile, written information about the diversity of the aromatic plants used is still lacking. In the future, it is feared that knowledge about the tradition could be lost in society, hence extracting information and documentation needs to be carried out on the aromatic plants.⁵

Ethnomedicine is an area of ethnobotanical studies that discusses scientifically validated indigenous practices for preserving health or medical systems.¹ The aromatic plants contain essential oils, mostly terpenoid compounds that should be identified.⁶ This study was conducted in Banjarmasin, the origin of the ethnic Banjar.⁷ Furthermore, the selection of North Banjarmasin was influenced by the Central Statistics Agency,⁸ population census data, which recorded most of Banjar ethnic group. Moreover, the study aimed to identify aromatic plants and the percentage of the different parts used.

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Methods

Study time and place

This study was conducted from February–March 2019 in North Banjarmasin Sub-district, Banjarmasin City (Figure 1).

Tools and Materials

Data collection was conducted using informed consent sheets, respondent demographics, a list of questions, and questionnaires. Apparatus used for the plants' terpenoid test include mortar, beaker, test tube, test tube rack, and drop pipette. The solvents and reagents used include methanol, chloroform, and Lieberman Buchard reagent of anhydrous acetic and sulfuric acids.

Field data collection method

The therapist's data was collected through semi-structural interviews following questions from the list according to their needs. In contrast, the plant samples were taken, captured, and collected. Species of the collected plants were recognized, and terpenoid components were analysed using plant methanol extract and Lieberman Burchard reagent.^{9,10}

Population

The population were people in North Banjarmasin Sub-district who practised the tradition, and the recommendations for research permits were carried out at the National Unity Agency 072/109-Sekr/Bakesbapol. Ethical clearance was given by the Faculty of Health Research Ethics Commission and Banjarmasin Politics, and Lambung Mangkurat University of Medicine with number 82/KEPK-FK UNLAM/EC/III/2019.

Sample

The sample was divided into therapists and patients that fulfilled the following criteria:

1. The therapists should come originally from Banjar ethnicity, be accustomed to the plants used, possess sufficient procedure knowledge (using traditional equipment), *Batimung* practice awareness creator to the public, and possess the willingness to participate.
2. The patients should have performed the tradition in February 2019 and provided willingness to participate.
3. Incomplete or unfilled questionnaires as well as therapists using modern equipment were eliminated from the study.

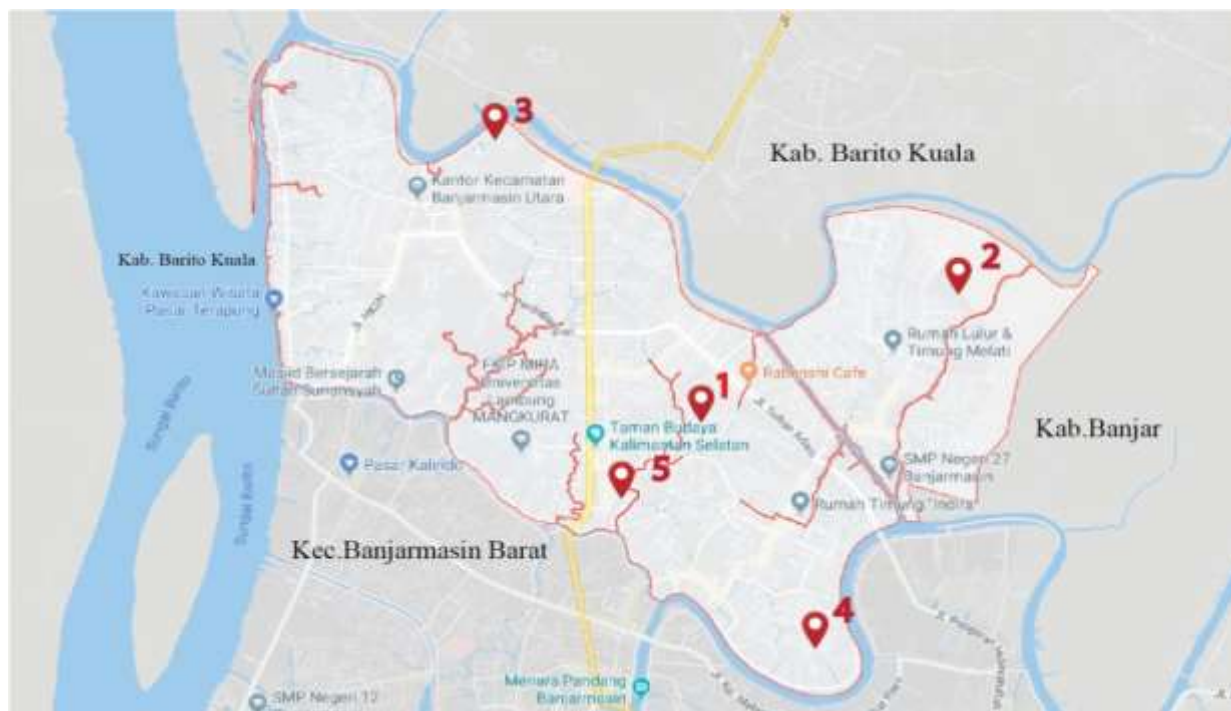


Figure 1: The map of the research site (own collection)

Sampling method

The purposive and quota sampling methods were used.^{11,12}

Number of samples

The samples included 5 therapists recommended by liaisons and matched the inclusion criteria,^{13,14} while 98 users were sampled using Snedecor and Cochran calculations.

Statistical analysis

The data - aromatic plant species, parts, methods employed, and function of *Batimung* were gathered and analysed using percentages.

Results and Discussion

Demographics of Respondents in North Banjarmasin Sub-district

The results revealed that females predominated as indicated in Table 1 because they place a higher importance on appearance and body care,⁵ and housewives dominated the patients at 47.96%. Furthermore, they were mostly between 26-35 years at 48.98% and included senior high school students aged 15-19 years who are more aware of the benefits of beauty and body treatment.⁵ Additionally, the users included housewives, private employees, traders, student entrepreneurs, and others.

Table 2 demonstrates that all therapists were female due to their preponderance, and they were mostly old, threatening *Batimung*'s sustainability. Therefore, young people should be trained to preserve and share this tradition for future practice.^{5,15} The educational level of therapists varied from Elementary, Junior, and Senior High Schools.

Ethnomedicine of Aromatic Plants in Batimung

Batimung plant species

The study showed 26 species from 15 families as shown in Table 3. The most used plants are kaffir lime and pandanus at 12.29% and 8.78%, respectively while Zingiberaceae is the most prominent plant family at 19.30%.

Batimung Application

Batimung is a steam bath employing aromatic plants that is used by the Banjar ethnic group, and it utilizes hot steam from boiled plants to make the user sweat. The results of the survey in the field, and the implementation begins with preparing the necessary materials and

tools. The materials used are adjusted to the user's goals in utilizing *Batimung*, and the tools needed are pot, wooden bench, purun mat, wooden spoon and blanket or cloth cover, as shown in Figures 2A and 2B.

The therapist mixes and boils the prepared plants using water. After boiling, the user sits on a wooden bench provided, and a pot filled with *Batimung* is placed in a closed state between the user's feet. The purun mat is conical or circular to cover the user's body, and a blanket is placed around the mat to cover the open space, as shown in Figure 1C. After the user's entire body is tightly closed, the pot's lid is slowly opened, allowing the hot steam from the boiled plants to go out. A wooden spoon is used for stirring the plant mixture, and after sometime, the kaffir lime mat and blanket is removed. The decoction can be used to boil two to three more times for one batch of *Batimung*. After the implementation, the user is advised to drink water or sweet drinks to restore the lost body fluids. The tradition is not much different from the procedure described by Ideham.³ However, in the practice to cure disease, there is a special mantra that the therapist pronounces during its implementation.

Terpenoid test on Batimung plants

The terpenoid test showed that 25 out of the 27 samples were positive, while the remaining 2 (corn & coconut) were negative, indicated by a lack of colour or a brownish ring. The plants positive for terpenoids include *Citrus hystrix* DC., *Amaryllifolius* Roxb., *Alyxia reinwardtii* BI., *Curcuma xanthorrhiza* Roxb., *Rosa* sp., *Cananga odorata*, *Jasminum samba*, *Curcuma heyneana*, *Vetiveria zizanioides* L., *Cinnamomum burmanii* BI., *Ligustrum indicum*, *Cymbopogon citratus* DC., *Cymbopogon nardus* L., *Michelia* sp., *Zingiber officinale*, *Kaempferia galangal* L., *Curcuma domestica*, *Alpinia purpurata* K.Schum., *Caesalpinia sappan* L., *Pagostemon cablin*, *Arcangelisia flava* Merr., *Massoia aromatica* Becc., *Citrus limon* Burm., *Cocos nucifera* L., and *Saccharum officinarum*. Additionally, the sugarcane sample using the Lieberman-Buchard test showed a brownish ring and turned green which indicated the presence of terpenoid and steroid compounds.¹⁶⁻¹⁸ Terpenoids are compounds composed of an isoprene (C₅) skeleton. Many of these compounds are contained in plants with a distinctive or aromatic smell, classified as monoterpenes.

Table 1: Characteristics of *Batimung* Users

Characteristics	Total	Percentage (%)
Gender		
Man	14	14.29
Woman	84	85.71
Age		
15-25	22	22.45
26-35	48	48.98
36-45	17	17.35
46-55	7	7.14
>55	4	4.08
Education		
Not completed in primary school	1	1.02
SD	5	5.10
Middle School/Equivalent	19	19.39
High School/Equivalent	58	59.18
Academy/College	15	15.31
Work		
Not working/IRT	47	47.96
Private employees	27	27.55
Student/Student	8	8.16
civil servant	1	1.02
Entrepreneur/Trader	14	14.29
Etc	1	1.02
Total	98	100

Traditionally, aromatherapy has also been used for anxiety relief and mood improvement. In alleviating anxiety and depression, essential oils have no drawbacks associated with conventional medication therapy. In-vivo studies on animal models have verified these essential oils' anxiolytic effects and their significant components' interactions with central nervous system receptors. Therefore, it seems reasonable to argue that the modulation of glutamate and GABA neurotransmitter systems are likely to be the critical mechanisms responsible for the sedative, anxiolytic, and anticonvulsant properties of linalool and essential oils. Popular anxiolytic essential oils are rich in terpenoid alcohols, such as linalool, geraniol, citronellol, and monoterpene limonene or citral. Other formulations that contain these terpenoids as major components may serve as important aromatherapeutic.¹⁹

Batimung plant parts

The study showed that 42.68% of people use the rhizomes for disease healing as shown in Table 4, while 24% utilize the leaves and flowers for body treatment as described in Table 5. Furthermore, the treatment is used to treat wisa caused by jinn, which weakens and yellows the body. The therapists use it to warm the body and induce perspiration to expel the jinn or evil spirit. The Banjar people linked the "wisa sickness" with malaria, dengue fever, hepatitis or depression.

Removing leaves does not damage the plant because they can easily grow back and be used continuously.²⁰ The flowers are used for traditional rituals such as funeral ceremonies, *batapung tawar*, bathing, weddings, and others.²¹ Furthermore, therapists use flowers because they are easily obtained and have a distinctive aroma beneficial for body treatment.

Plants such as roses, jasmine, ylang flower, kaffir lime, and vetiver used for body care purposes mostly contain essential oils. The research by Ardela *et al.*²² show that the aroma of roses can reduce pain intensity in primary dysmenorrhea (menstrual pain) from moderate to mild on a scale of 5 to 0.9.

In the Hongratanaworakit study,²³ rose essential oil was shown to significantly reduce respiratory rate, systolic blood pressure, and blood oxygen saturation. Furthermore, the study subjects group felt calmer, relaxed and less alert than the control.

Table 2: Characteristics of the Therapist Respondents in *Batimung*

No	Initials	Gender	Age (years)	Education	Ethnicity	The Origin of Knowledge in <i>Batimung</i>
1	A	Woman	64	Junior High School	Banjar	Hereditary
2	J	Woman	55	Elementary School	Banjar	Training
3	K	Woman	55	Junior High School	Mix of Banjar and Dayak	Hereditary
4	N	Woman	55	Senior High School	Banjar	Hereditary
5	AA	Woman	53	Elementary School	Banjar	Hereditary

Table 3: Types of *Batimung* Plants

No	Plant Name	Latin name	Family	Local Name	Total	Percentage (%)
1	Orange	<i>Citrus hystrix</i> DC.	Rutaceae	Limau purut	7	12.29
2	Pandan	<i>Pandanus amaryllifolius</i> Roxb.	Pandanaceae	Pudak	5	8.78
3	Pulosari	<i>Alyxia reinwardtii</i> Bl.	Apocynaceae	Pulosantan	4	7.03
4	Curcuma	<i>Curcuma xanthorrhiza</i> Roxb.	Zingiberaceae	Temulawak	4	7.03
5	Rose	<i>Rosa</i> sp.	Rosaceae	Mawar	4	7.03
6	Ylang Flower	<i>Cananga odorata</i> .	Annonaceae	Kenanga	4	7.03
7	Jasmine	<i>Jasminum sambac</i> .	Oleaceae	Melati	3	5.26
8	Temugiring	<i>Curcuma heyneana</i> .	Zingiberaceae	Temugiring	3	5.26
9	Vetiver	<i>Vetiveria zizanioides</i> L.	Gramineae	Akar sariwangi	3	5.26
10	Cinnamon	<i>Cinnamomum burmanii</i> Bl.	Lauraceae	Kayu manis	2	3.51
11	Ganti	<i>Ligustrum indicum aiton</i> f.	Oleaceae	Ganti	2	3.51

12	Lemongrass	<i>Cymbopogon citratus</i> DC.	Gramineae	Sarai	2	3.51
13	Lemongrass scented	<i>Cymbopogon nardus</i> L.	Gramineae	Sarai wangi	1	1.75
14	Cempaka	<i>Michelia</i> sp.	Magnollaceae	Cempaka	1	1.75
15	Ginger	<i>Zingiber officinale</i> .	Zingiberaceae	Tipakan	1	1.75
16	Aromatic ginger	<i>Kaempferia galangal</i> L.	Zingiberaceae	Kencur	1	1.75
17	Turmeric	<i>Curcuma domestica</i> .	Zingiberaceae	Janar	1	1.75
18	Galangal	<i>Alpinia purpurata</i> K.Schum.	Zingiberaceae	Laos	1	1.75
19	Sappan wood	<i>Caesalpinia sappan</i> L.	Fabaceae	Secang	1	1.75
20	Patchouli	<i>Pogostemon cablin</i> .	Lamiaceae	Nilam	1	1.75
21	Yellow root	<i>Arcangelisia flava</i> Merr.	Ranunculaceae	Kayu kuning	1	1.75
22	Mesoyi	<i>Massoia aromatica</i> Becc.	Lauraceae	Mesoyi	1	1.75
23	Coconut	<i>Cocos nucifera</i> L.	Arecaceae	Niur	1	1.75
24	Lemon	<i>Citrus limon</i> Burm.	Rutaceae	Lemon	1	1.75
25	Sugarcane	<i>Saccharum officinarum</i> .	Gramineae	Niran habang	1	1.75
26	Corn	<i>Zea mays</i> .	Poaceae	Jagung	1	1.75
Total					57	100

Table 4: Parts of the *Batimung* Plant used for Healing Diseases

No	Plant Parts	Plants Name	Total	Percentage (%)
1	Rhizome	Galangal (<i>Alpinia purpurata</i> K.Schum.) Ginger (<i>Zingiber officinale</i>) Aromatic ginger (<i>Kaempferia galangal</i> L.)	3	42.86
2	Stem	Sugarcane (<i>Saccharum officinarum</i>) Lemongrass (<i>Cymbopogon citratus</i> DC.)	2	28.56
3	Shell	Coconut (<i>Cocos nucifera</i> L.)	1	14.29
4	Cob	Corn (<i>Zea mays</i>)	1	14.29
Total			7	100

**Figure 2:** (A) Mix of plants in the tradition; (B) Wooden bench, pot, and wooden spoon; (C) Example of a mat used

It is concluded that using roses in aromatherapy can reduce stress and depression in humans. The use is not limited to just relaxation, and oils from ylang and lemon can also be useful in overcoming insomnia.²⁴

Batimung plant processing method

All aromatic plants are processed by boiling (Table 6).

In *Batimung*, the aromatic plants are boiled, and the steam is used for bathing. However, some plants need to be chopped, kneaded, squeezed and grated before boiling. Direct boiling at 66.67% is the highest processing method where the plant is boiled in a covered pot; this is because a physical impact is produced. Batubara *et al.*²⁵ stated

that the process should be conducted for 20 – 40 minutes until the water changes colour, and the plants wither.

The dosage of Batimung plant use

Batimung herb uses 5 – 12 species of plants boiled together, and the dosage is based on the therapist's experience (Table 7).

The use of steam baths in other areas such as West Kalimantan (Betagas) is used for relaxation media and customs before marriage.⁵ However, in contrast to the purpose of using steam baths in the Karo Batak (Oukup) community, it treats diseases such as vertigo, diabetes, gout, colds, skin pain, insomnia, fatigue and post-natal pain.²⁵ In Minahasa (Bakera), it is predominantly used to restore or recover the body after childbirth.²⁶ The difference in the purpose of use is influenced by customs, habits and mixtures of ingredients in each region.

The purpose of using Batimung

The results showed that while 98.98% of *Batimung* is used for body treatment, 1.02% cures disease. The body treatments prevent or eliminate body odour, provide relaxation, reduce excessive sweat, eliminate fatigue, enhance natural body smell, and are used in traditional wedding performances.²⁷ Thermotherapy soothes symptoms such as muscular strain, heaviness in the limbs, oedema, loss of appetite, and constipation. The essential oils of the plants have an immuno-stimulant antiseptic and antiphlogistic effect.^{26,28,29} The use of *Batimung* to cure disease is less desirable due to easier and affordable access to health services in Banjarmasin, but it is an alternative option recommended by therapists.

Table 5: Parts of the *Batimung* Plant for Body Care

No	Plant Parts	Plant Name	Total	Percentage (%)
1	Flower	Pandan (<i>Pandanus amaryllifolius</i> Roxb.)	12	24
		Kaffir lime (<i>Citrus hystrix</i> DC.)		
		Turmeric (<i>Curcuma domestica</i> .)		
		Lemongrass (<i>Cymbopogon nardus</i> L.)		
		Patchouli (<i>Pogostemon cablin</i> .)		
2	Stem Bark	Jasmine (<i>Jasminum sambac</i>)	12	24
		Ylang (<i>Cananga odorata</i> L.)		
		Roses (<i>Rosa</i> sp.)		
		Cempaka (<i>Michelia</i> sp.)		
3	Rhizome	Cinnamon (<i>Cinnamomum burmanii</i> BL.)	8	16
		Mesoyi (<i>Massoia aromatica</i> Becc.)		
		Sappan (<i>Caesalpinia sappan</i> L.)		
		Pulosari (<i>Alyxia reinwardtii</i> BL.)		
4	Root	Curcuma (<i>Curcuma xanthorrhiza</i> Roxb.)	7	14
		Temugiring (<i>Curcuma heyneana</i>)		
5	Fruit	Vetiver (<i>Vetiveria zizanioides</i> L.)	4	8
		Yellow Root (<i>Arcangelisia flava</i> Merr.)		
6	Flower	Lemon (<i>Citrus limon</i> Burm.)	4	8
		Kaffir lime (<i>Citrus hystrix</i> DC.)		
7	Stem	Lemongrass (<i>Cymbopogon citratus</i> DC.)	3	6
		Ganti (<i>Ligustrum indicum aiton f.</i>)		
Total			50	100

Table 6: Methods of Processing *Batimung* Plants

No	Cara pengolahan	Total	Percentage (%)
1	Boiled straight away	38	66,67
2	Chopped and boiled	7	12,28
3	Kneaded and boiled	7	12,28
4	Squeezed and boiled	3	5,26
5	Grated and boiled	2	3,51
Total		57	100

The period of use depends on the purpose, and when it is for body care, the user is expected to continuously utilize the combination for 1 year at most. Users for 3 days intend to practice Banjar wedding traditions, while one day users aim to treat ailments. According to the therapist, pre-marriage is conducted three days prior to the wedding and *Batimung* is performed twice yearly. The pre-wedding application is intended to reduce perspiration for bridal makeup to last longer. Due to the instantaneous nature of the action, the treatment of disease requires only one to two consecutive applications. *Batimung* should be used for 15 to 60 minutes, or until the decoction of the plant begins to cool, depending on the strength of the user, as prescribed by the therapist.

Table 7: The dose of the use of the *Batimung* plant

Plant Name	Plant Parts	The intended use	Total
Lime	Leaf	Caring for the body	1 handful (18.11-23.66 g)
Lime	Fruit	Caring for the body	½ -2 fruits (40.12 – 179.12 g)
Pandan	Leaf	Caring for the body	11-17 sheets (22.68-36.37 g)
Pulosari	Bark	Caring for the body	1 tablespoon (8 – 12.1 g)
Curcuma	Rhizome	Caring for the body	¼ – 1 part (17.21 -32.34 g)
Rose	Flower	Caring for the body	1-3 flowers (2.68 – 9.21 g)
Ylang Flower	Flower	Caring for the body	1 – 5 flowers (2.31-7.71 g)
Jasmine	Flower	Caring for the body	4-10 flowers (1.83-4.26 g)
Temugiring	Rhizome	Caring for the body	3 – 1 rhizome (3,41- 30 g)
Vetiver	Root	Caring for the body	2-5 root (4.6 – 15.6 (4g)
Cinnamon	Bark	Caring for the body	¼ - 1 bark (2-10.14 g)

Ganti	Stem	Caring for the body	1 tablespoon (1-3.41 g)
Lemongrass	Stem	Cure disease	1 stem (8-17.78 g)
Cempaka	Flower	Caring for the body	2 flowers(5-8.21 g)
Turmeric	Leaf	Caring for the body	5 sheet (12.1 -15.21 g)
Galangal	Rhizome	Cure disease	1 rizhome (74.68 g)
Ginger	Rhizome	Cure disease	1 rizhome (26.34 g)
Sappan wood	Bark	Caring for the body	2 handheld (16.17 -18 g)
Lemongrass scented	Leaf	Caring for the body	8 sheet (14.21 – 18.11 g)
Patchouli	Leaf	Caring for the body	10 sheet (4.19-6.12 g)
Yellow root	Root	Caring for the body	1 handheld (50.12 – 60.71 g)
Aromatic Ginger	Rhizome	Cure disease	1 rizhome (18.01 g)
Mesoyi	Bark	Caring for the body	1 part bark (2 -5.21 g)
Coconut	Shell	Cure disease	1 shell (25.21 g)
Lemon	Fruit	Caring for the body	½ fruit (40.17-51.15 g)
Sugarcane	Stem	Cure disease	¼ part bark (20.87 g)
Corn	Hump	Cure disease	1 hump (7.12 g)

Conclusion

There are 27 species of aromatic plants used in *Batimung* tradition, where 25 tested positive for terpenoids. The plant parts used for body treatment are leaves (24%), flowers (24%), bark (16%), rhizomes (14%), roots (8%), fruits (8%), and stems (6%). Meanwhile, the parts used to cure disease are rhizomes (42.86%), stems (28.56%), and shells and cobs (14.29%).

Conflict of Interest

The authors declare no conflict of interest.

Authors' Declaration

The authors hereby declare that the work presented in this article is original and that any liability for claims relating to the content of this article will be borne by them.

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